

REMARKS

Claims 1-5 and 7-13 are now present in this application.

Claim 1 has been amended, and claim 6 has been cancelled without prejudice or disclaimer. Reconsideration of the application, as amended, is respectfully requested.

Claims 1-3 stand rejected under 35 USC 103 as being unpatentable over HIGUCHI, U.S. Patent 5,790,400, in view of NARA et al., U.S. Patent 6,388,747, and OGATA et al., U.S. Patent 6,281,962. This rejection is respectfully traversed.

Claims 4, 5, 8, and 9 stand rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al., and further in view of LI, U.S. Patent 6,276,997. This rejection is respectfully traversed.

Claim 6 stand rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al., and further in view of SANDOVAL, U.S. Patent 6,345,259. This rejection is respectfully traversed.

Claim 7 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al., and further in view of WEBSTER, U.S. Patent 5,505,090. This rejection is respectfully traversed.

Claim 10 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al.,

and further in view of SCHMOLKE, U.S. Patent 6,333,785. This rejection is respectfully traversed.

Claim 11 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al., and further in view of CHARLES, U.S. Patent 6,335,559. This rejection is respectfully traversed.

Claim 12 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al., and further in view of HINKLE, U.S. Patent 6,190,313. This rejection is respectfully traversed.

Claim 13 stands rejected under 35 USC 103 as being unpatentable over HIGUCHI in view of NARA et al. and OGATA et al., and further in view of JUSZKIEWICZ et al., U.S. Patent 6,353,169. This rejection is respectfully traversed.

1. None of Higuchi, Nara and Ogata teaches or suggests a system, embodied in an MES, for monitoring stability of manufacturing equipment and adjusting inspection frequency according to inspection results obtained during the monitoring process.

Higuchi

Higuchi teaches "an object inspection apparatus for **clearly indicating the inspecting positions of an object under inspection** so that inspection work thereon is performed efficiently has its

inspection terminal set up on an inspection line. An image of the part to be inspected and a plurality of inspection items associated therewith are displayed on a screen of the terminal. The **worker** in charge of inspection performs inspection by **following what is thus displayed...**"

Additionally, Higuchi teaches in col. 8 "in the inspection process of step 207, inspection is carried out as many times as the sampling rate determined in step 206. For example, if the determined sampling rate is 32, a total of 32 parts are inspected."

Accordingly, Higuchi teaches an object inspection apparatus for clearly indicating the inspecting positions of an object under inspection. The focus of the objection inspection apparatus taught by Higuchi is to clearly indicate the inspecting positions of the inspected object, thus enabling workers with no specific skills to carry out the inspection. However, claim 1 of the present application discloses a system for monitoring stability of manufacturing equipment by inspecting semi-manufactured products periodically during production. According to the claimed invention, inspection is directed by a process executor and carried out automatically. Therefore, the "inspecting positions of the object," the major issue of the object inspection apparatus taught by Higuchi, are not an issue in the presently claimed invention.

Furthermore, the "sampling rate" taught by Higuchi is a setting specifying the **sampling ratio** of parts to be inspected. In

other words, the "sampling rate" taught by Higuchi is the number of parts checked per batch, depicted in Fig. 2 as a box of parts. On the contrary, the "sampling rate" in the claimed invention is the number of inspections performed in a predetermined period of time, a **sampling frequency**. Therefore, the "sampling rate" taught by Higuchi is irrelevant to the sampling rate taught in the presently claimed invention.

Nara

Nara teaches "inspection method, apparatus, and system for a **circuit pattern**, in which when various conditions which are necessary in case of inspecting a fine circuit pattern by using an image formed by irradiating white light, a laser beam, or a charged particle beam are set, its operating efficiency can be improved..."

Additionally, Nara teaches in col. 28, line 58, "the sampling rate is a rate at which the inspection region is thinned out."

Accordingly, the focus of the inspection apparatus taught by Nara is to solve the problem of throughput deterioration caused by inspection operation. Claim 1 of the presently claimed invention discloses a system of monitoring stability of manufacturing equipment by inspecting semi-manufactured products periodically during production. However, the inspection apparatus taught by Nara does not focus on monitoring stability of manufacturing equipment, as does the presently claimed invention.

Furthermore, the "sampling rate" taught by Nara is a number of chips inspected per wafer, which creates a **spatial sampling ratio**. On the contrary, the "sampling rate" in the presently claimed invention is the number of inspections performed in a predetermined period of time, a **sampling frequency**. Therefore, the "sampling rate" taught by Nara is irrelevant to the sampling rate taught in the presently claimed invention.

Ogata

Ogata teaches inspection equipment in a coating and developing system. The inspection equipment sends an inspection result as a detection signal to a controller, and the controller controls exposure conditions for an aligner according to the inspection result. The inspection equipment is equipped in the coating and developing system, thus wafer may be transferred between processing units and the inspection equipment by an internal main transfer device, and thereby avoiding contamination.

The presently claimed invention teaches a system for monitoring run-to-run variability and enables run-to-run process control in a wafer-manufacturing environment. According to independent claim 1, the systems comprises a Manufacturing Executive System (MES). The presently claimed invention is embodied in an MES, and thus can be implemented with various manufacturing equipment simultaneously, and no hardware modification is required.

2. None of Higuchi, Nara and Ogata teaches or suggests a system, embodied in an MES, capable of monitoring run-to-run variability in semiconductor manufacturing.

As discussed above, Higuchi teaches an object inspection apparatus for assisting workers in inspecting objections and Nara teaches an inspection apparatus for adjusting inspection conditions in a circuit pattern inspection. Both focus on improving inspection efficiency within a certain machine-run, but teach nothing about run-to-run process control.

The presently claimed invention, however, teaches a system for monitoring run-to-run variability and enables run-to-run process control in a wafer-manufacturing environment. The system in the presently claimed invention allows **modification of a product recipe between machine runs, thereby minimizing process drift, shift, and variability, and thus, costs.**

None of Higuchi, Nara, and Ogata, either alone or in combination, teaches the ability to monitor run-to-run variability embodied in an MES, and the secondary references utilized by the Examiner fail to overcome the deficiencies of the primary references. Accordingly, reconsideration and withdrawal of the 35 USC 103 rejections are respectfully requested.

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

Because the additional prior art cited by the Examiner has been included merely to show the state of the prior art and has not been utilized to reject the claims, no further comments concerning these documents are considered necessary at this time.

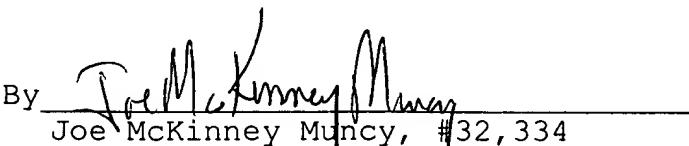
In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants respectfully petition for a one (1) month extension of time for filing a response in connection with the present application and the required fee of \$120.00 is attached herewith.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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